

What Is Claimed Is:

1. A video signal processing apparatus, comprising:  
a plurality of contour correction modules to correct  
a digital video signal to be input for a contour; and  
a selection module to select any of said plurality of  
contour correction modules, wherein

the one predetermined contour correction module among  
said plurality of contour correction modules includes a  
contour portion detection module to detect a contour portion  
of said input digital video signal, and  
a contour portion correction module to correct the contour  
portion of the digital video signal corrected for a contour  
by said contour correction module other than said  
predetermined contour correction module; and

said selection module selects the digital video signal  
output from said contour portion correction module when the  
contour portion is detected by said contour portion detection  
module.

2. The video signal processing apparatus according  
to claim 1, wherein

said contour correction module other than said  
predetermined contour correction module corrects a contour  
by generating an undershoot and an overshoot in the contour  
portion of said input digital video signal.

3. The video signal processing apparatus according to claim 2, wherein

said contour portion correction module includes a contour correction signal generation module to generate a contour correction signal in accordance with the contour portion of said input digital video signal, and a mixing module to mix said contour correction signal output from said contour correction signal generation module and the digital video signal whose contour is corrected by said contour correction module other than said predetermined contour correction module at a predetermined ratio and to suppress the undershoot of said contour-corrected digital video signal; and

said selection module selects an output digital signal of said mixing module when the contour portion is detected by said contour portion detection module.

4. The video signal processing apparatus according to claim 3, wherein

said contour portion detection module judges whether the detected contour portion is a rising contour portion or a falling contour portion, and delays detection timing of said contour portion of said contour portion period when the detected contour portion is the falling contour portion; and

said contour correction signal generation module generates said generated contour portion correction signal in accordance with said contour portion period said contour

portion detection module detected.

5. The video signal processing apparatus according to claim 1, wherein

said contour portion detection module comprises

a first module to assume a flat portion to exist when a fluctuation of said digital video signal is within the range of a preset threshold, and

a second module, when a slope between said two flat portions detected by said first module always ascends or descends and the absolute value of the difference of a signal level in the slope is higher than the preset threshold, to assume the contour portion of said digital video signal to exist between the two flat portions.

6. The video signal processing apparatus according to claim 1, wherein

said contour portion detection module comprises

a first module to assume a flat to exist when the fluctuation of said digital video signal is within the range of a preset threshold,

a second module to assume a changing point at which the slope on which the fluctuation of said digital video signal sequentially ascends or descends moves to the slope on which it descends or ascends to be the crest of a peak or the root of a valley, and

a third module, when the absolute value of the difference

of the signal level between flat portion detected by said first module and changing point detected by said second module is higher than the preset threshold, to assume the contour portion of said digital video signal to exist between said flat portion and said changing point.

7. The video signal processing apparatus according to claim 1, wherein

said contour portion detection module comprises

a first module to assume a first changing point at which a slope on which the fluctuation of said digital video signal subsequently ascends or descends moves to the slope on which it descends or ascends to be the crest of a peak or the root of a valley and to assume a second changing point at which the slope on which it sequentially descends or ascends from said first changing point and then it ascends or descends to be the root of the valley and the crest of the peak, and

a third module to assume the contour portion of said digital video signal to exist between said first and second changing points when the absolute value of the difference between said changing points detected by said first module is higher than the preset threshold.

8. A camera device, comprising:

an imaging module to photograph an object and output an electric signal;

a signal processing module to process the electric

signal output from said imaging module to generate a first digital video signal; and

video signal processing module to correct the contour of said first digital video signal, wherein the video signal processing apparatus according to claim 1 is used as said video signal processing module.

9. A video signal processing method, comprising the steps of:

generating a first digital video signal corrected for a contour by enhancing the contour-corrected digital video signal to be input for the contour and a second digital video signal that suppresses an undershoot in the contour portion in which said first digital video signal is enhanced; and

selecting said digital video signal in a contour portion period, and selecting and outputting the first digital signal in a period other than said contour portion period.

10. An imaging method for processing a video signal obtained from an imaging module, obtaining a digital video signal, and correcting said digital video signal for a contour, comprising the steps of:

generating a first digital video signal corrected for the contour by enhancing the contour of a digital video signal to be input and a second digital video signal that suppresses an undershoot in the contour portion in which said first digital video signal is enhanced; and

selecting said digital video signal in a contour portion period, and selecting and outputting the first digital signal in a period other than said contour portion period.

11. An interpolation device, comprising:

a plurality of interpolation means that interpolates a digital video signal to be input; and

a selection means that selects any of said plurality of interpolation means, wherein

the one predetermined interpolation means among said plurality of interpolation means includes an edge detection means that detects an edge of said digital video signal and an edge enhancement means that enhances the edge, and

said selection means selects an interpolation signal in which the edge is enhanced by said edge enhancement means when the edge is detected by said edge detection means.

12. The interpolation device according to claim 11, wherein

said edge enhancement means includes an edge generation means and a mixing means,

said mixing means includes an operation means that mixes an edge signal generated by said edge generation means and an output signal of an interpolation means other than said predetermined interpolation means among said plurality of interpolation means at a desired ratio; and

said selection means selects the output signal of said

mixing means when the edge is detected by said edge detection means.

13. The interpolation device according to claim 12, wherein

said edge generation means generates an edge signal represented in frequency exceeding one half time of sampling frequency of said digital video signal.

14. The interpolation device according to 11, wherein said edge detection means comprises  
a first means for assuming a flat portion to exist when the fluctuation of said digital video signal is within the range of the preset threshold; and

a second means for assuming the edge of said digital video signal to exist between two flat portions when the slope between said two portions detected by said first means always ascends or descends and the absolute value of the difference of a signal level on the slope is higher than a preset threshold.

15. The interpolation device according to claim 11, wherein

said edge detection means comprises

a first means for assuming a flat portion to exist when the fluctuation of said digital video signal is within the range of the preset threshold;

a second means that assumes a changing point at which

the slope on which the fluctuation of said digital video signal subsequently ascends or descends moves to the slope on which it descends or ascends to be the crest of a peak or the root of a valley; and

a third means for assuming the edge of said digital video signal to exist between said flat portion and said changing point when the absolute value of the difference of the signal level between the flat portion detected by said first means and the changing point detected by said second means.

16. The interpolation device according to claim 11, wherein

said edge detection means comprises

a first means for assuming a first changing point at which a slope on which the fluctuation of said digital video signal subsequently ascends or descends moves to the slope on which it descends or ascends to be the crest of a peak or the root of a valley and for assuming a second changing point at which the slope on which it sequentially descends or ascends from said first changing point and then ascends or descends to be the root of the valley and the crest of the peak, and

a third means for assuming the edge of said digital video signal to exist between said first and second changing points when the absolute value of the difference between said changing points detected by said first means is higher than



the preset threshold.

17. A camera device, comprising:

an imaging means for photographing an object and outputting an electric signal;

a signal processing means for processing the electric signal output from said imaging means and generating a first digital video signal;

a means for generating a second digital video signal of a long sample cycle from said first digital video signal; and

an interpolation means for interpolating a sample from said second digital video signal, wherein the interpolation device according to claim 11 is used as said interpolation means.

18. The camera device according to claim 17, wherein

a means for generating a second digital video signal is a memory means, and

said memory means stores said first digital video signal, reads a part of said first digital video signal, and outputs said second video signal of an enlarged picture in which a part of the picture is enlarged using said first digital video signal.

19. An interpolation method for interpolating a digital video signal to be input by a plurality of

interpolation means, and selecting and outputting any of a plurality of said digital video signals that is interpolated, comprising the steps of:

detecting an edge of said digital video signal by the predetermined interpolation means among said plurality of interpolation means;

enhancing the edge; and

selecting said digital video signal of which the edge is enhanced in the detected edge period.

20. An imaging method for generating a second video signal of a long sample cycle from a signal-processed first digital video signal obtained by the photographing of an imaging means and performing the sample interpolation of said second digital video signal, wherein

the interpolation method according to claim 19 is used for the sample interpolation of said second digital video signal.